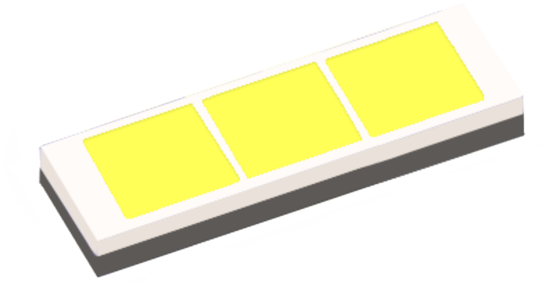
HeadLamp
Dong Feng DF-3BS



Dong Feng Headlamp series delivers unique brilliant light with outstanding efficiency and elegant design. It's able to meet requirements of output and stability due to it's developed and tested to withstand extreme environment conditions and wide range of temperature change. It also provides distinct optical performance and uniform light pattern. With Dong Feng's HeadLamp series, you will start to experience and enjoy the excellent adventure during driving time.

Features

- Excellent Brightness: 1100lm@ 1A
- Low thermal resistance
- Color: According to ECE/SAE

Applications

- Exterior Automotive Lighting
- Daytime Running Light
- High Beam/ Low Beam for headlight

Ordering Information

2	D	F 3	1 2	C W	x x	D B 3	x x x
X1	X2	X3-X4	X5-X6	X7-X8	X9-X10	X11-X13	X14-X16

X1 Type		X2 Emitter Series		X3-X4 Emitter Series		X5-X6 Emitter Power		X7-X8 Emitting Color	
Code	Type	Code	Type	Code	Type	Code	Type	Code	Type
2	Emitter	D	Dong Feng	F3	3Chip	12	12W	CW	Cool White

X9-X10 Internal Code		X11-X13 PCB Board		X14-X16 Series No.	
Code	Type	Code	Type	Code	Type
-	-	DB3	19x58	xxx	-

Type	Luminous Intensity IF = 1000mA IV [lm]	Ordering Code
Dong Feng -3BS	1100	2DF312CW06DB3002

Maximum Ratings

Parameter	Symbol	Values	Unit
DC Forward Current (TS = 25℃)	IF	-	mA
Peak Pulsed Current; (tp≤400ms, Duty cycle=10%)	I_{pulse}	2000	mA
Thermal Resistance	-	1.45	K/W
Reverse Voltage[1]	V_R	Note1	V
LED Junction temperature	Tj	150	℃
Operating temperature	T_{opr}	-40~+105	℃
Storage temperature	T_{stg}	-40~+125	℃

NOTE — *LEDs are not designed to drive in reverse bias.*

Characteristics (TS = 25 °C; IF = 1000 mA)

Parameter		Symbol	Values	Unit
Luminous Flux	(typ.)	-	1100	lm
Viewing angle	(typ.)	2ϕ	120	°
Forward voltage	(typ.)	V_F	9.9	V

NOTE — *2ϕ is the off-axis angle where the luminous intensity is half of the axial luminous intensity.*

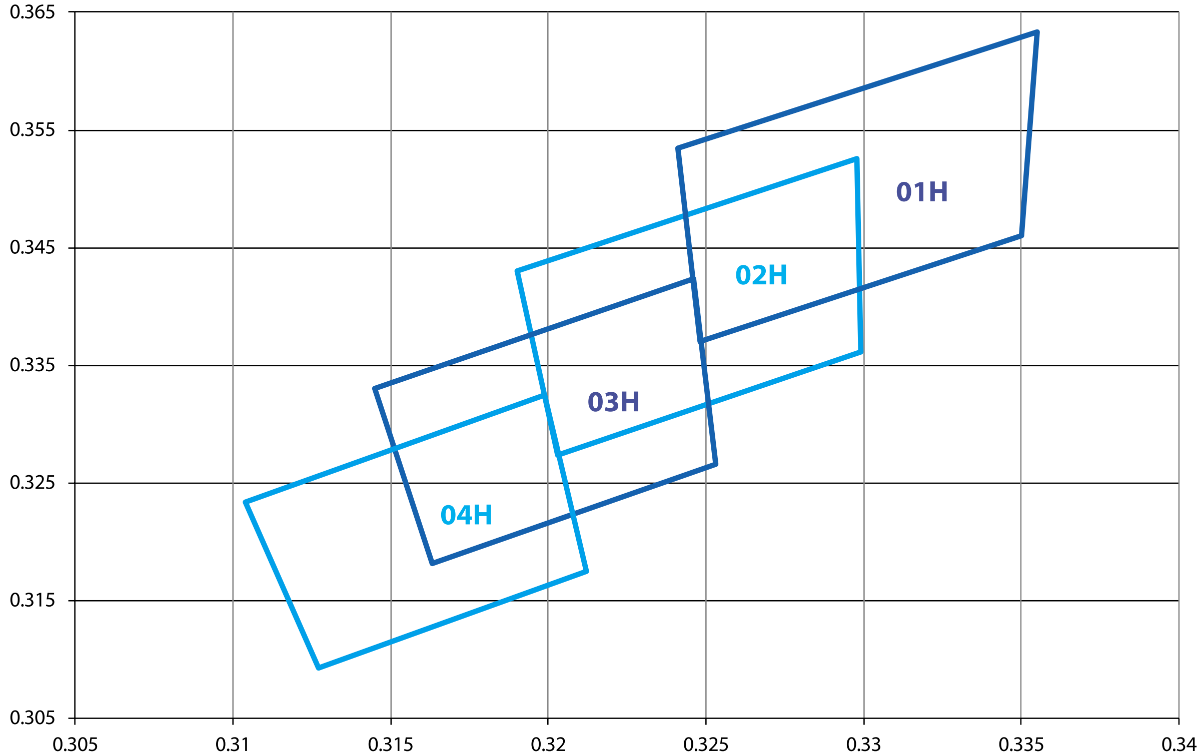
Brightness Groups

Group	(min.) Luminous Intensity Iv [lm]	(max.) Luminous Intensity Iv [lm]
L0	840	900
M0	900	1000
N0	1000	1120
O0	1120	1250
P0	1250	1400

Forward Voltage Groups

Group	(min.) VF [V]	(max.) VF [V]
V91	8.15	8.90
V92	8.90	9.65
V93	9.65	10.40
V94	10.40	11.15

Chromaticity Coordinate Groups



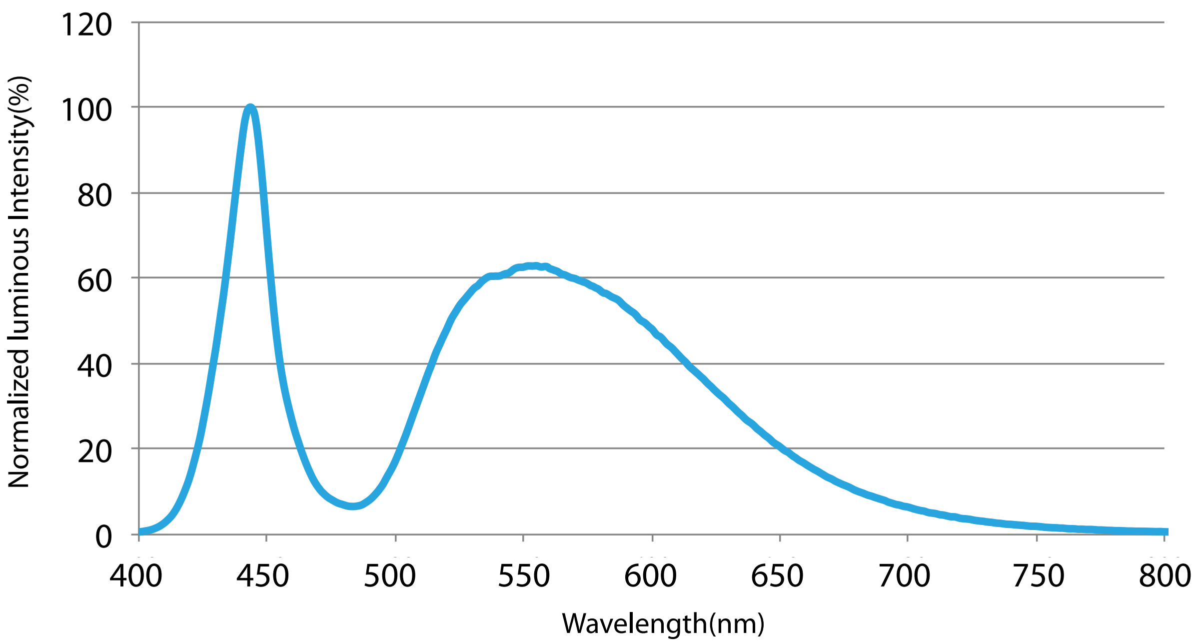
Color Chromaticity Groups

Group	Cx	Cy
01H	0.3241	0.3534
	0.3248	0.3370
	0.3350	0.3460
	0.3355	0.3633
02H	0.3190	0.3430
	0.3203	0.3274
	0.3298	0.3526
	0.3299	0.3361

Group	Cx	Cy
03H	0.3145	0.3330
	0.3163	0.3181
	0.3246	0.3424
	0.3253	0.3266
04H	0.3104	0.3234
	0.3127	0.3093
	0.3199	0.3325
	0.3212	0.3175

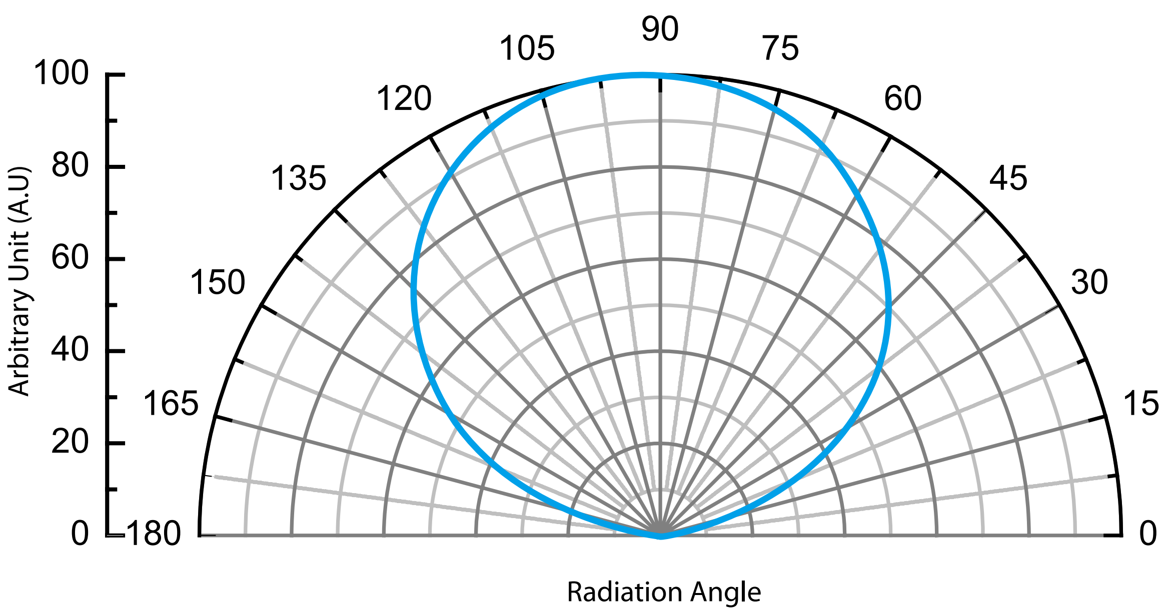
Relative Spectral Emission - V(λ) = Standard eye response curve

Irel = f (λ); TS = 25°C; IF = 1000mA



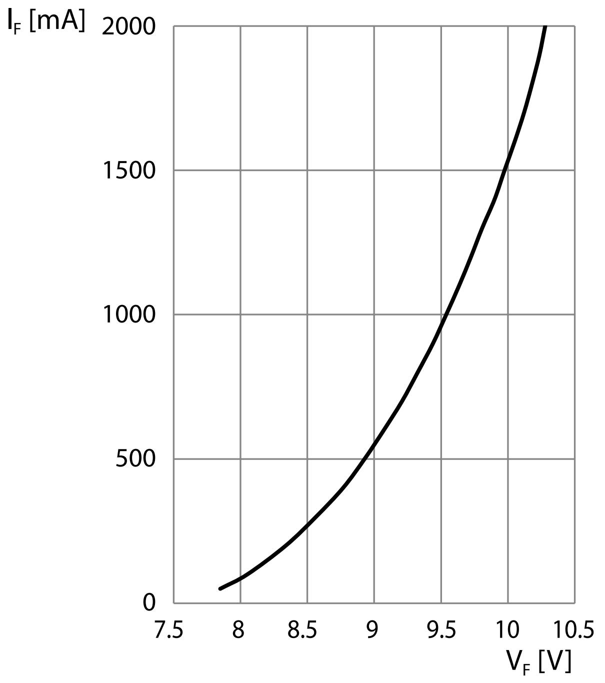
Radiation Characteristics

Irel = f (λ); TS = 25°C



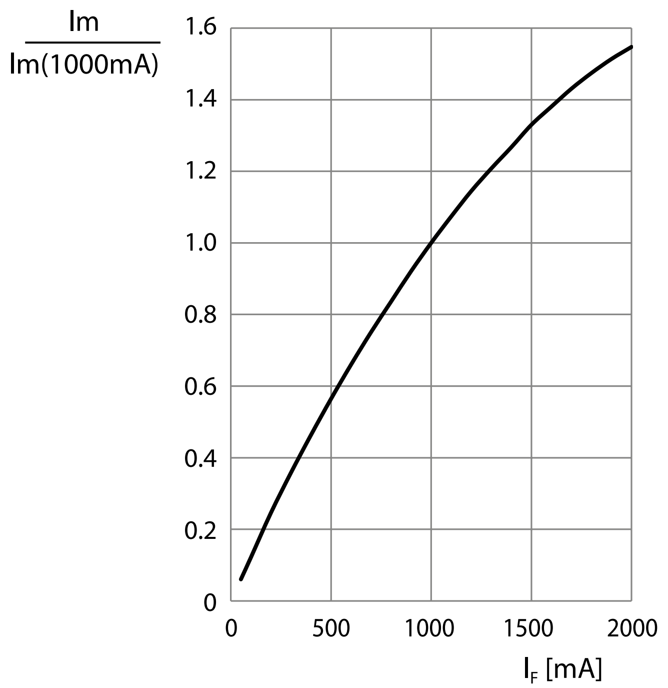
Forward Current

IF = f (VF); T_{Board} = 25°C



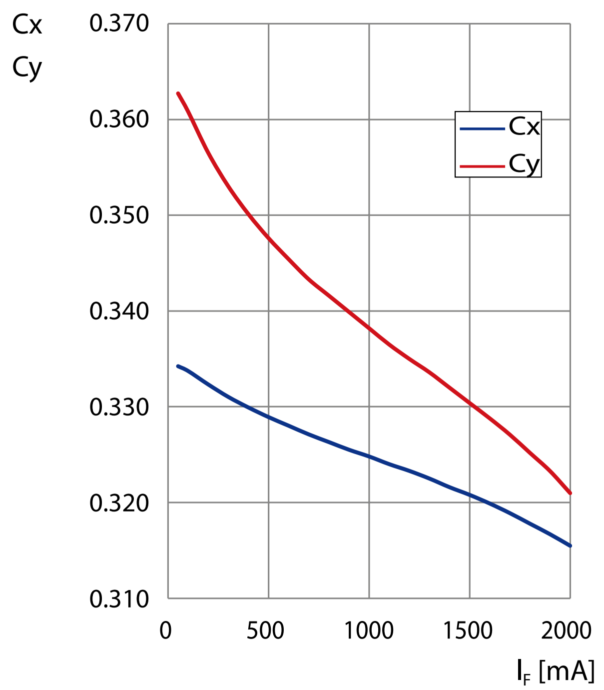
Relative Luminous Intensity

IV/IV (1000mA) = f(IF) ; T_{Board} = 25°C



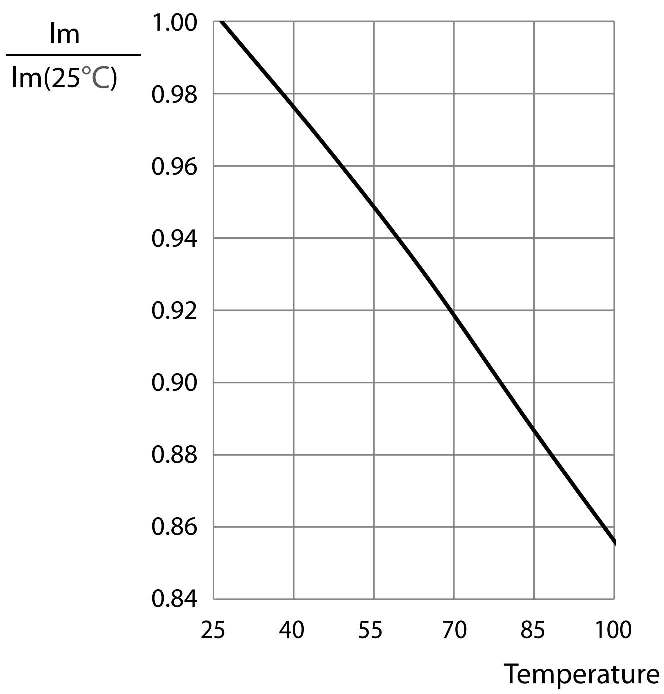
Chromaticity Coordinate Shift

ΔCx, ΔCy = f(IF); T_{Board} = 25 °C



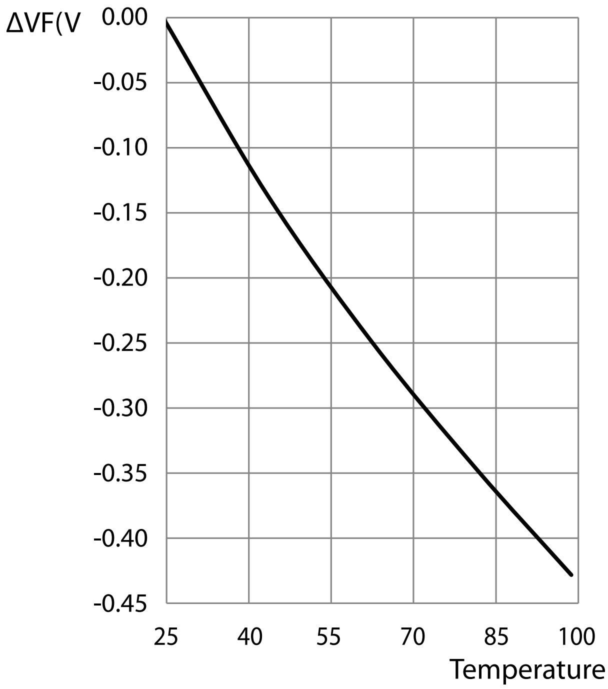
Relative Luminous Intensity

IV/IV(25°C) = f(Tj); IF = 1000mA



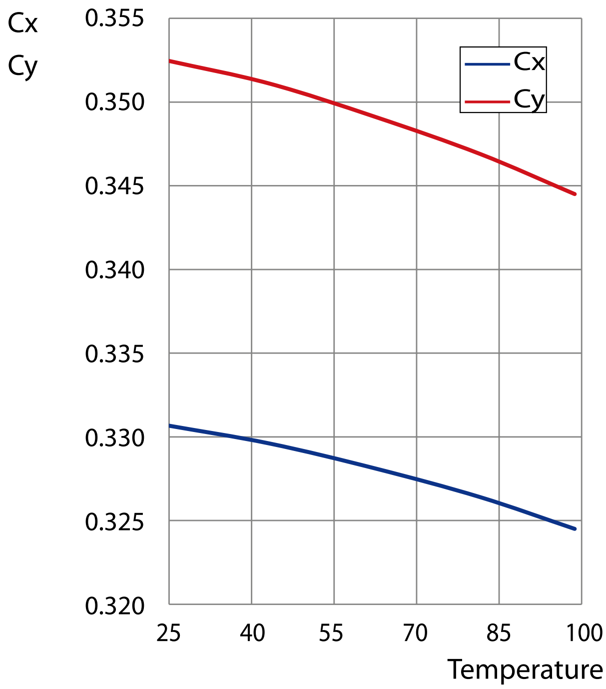
Relative Forward Voltage

ΔVF = VF-VF(25°C) = f(Tj); IF = 1000mA



Chromaticity Coordinate Shift

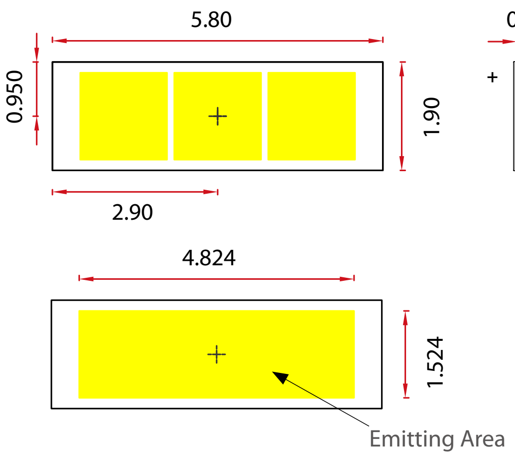
Cx, Cy = f(IF); IF = 1000mA



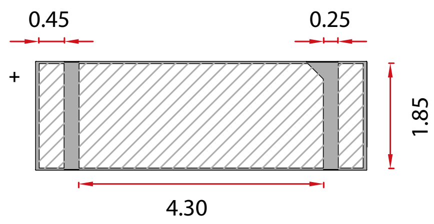
Mechanical Dimensions

Component

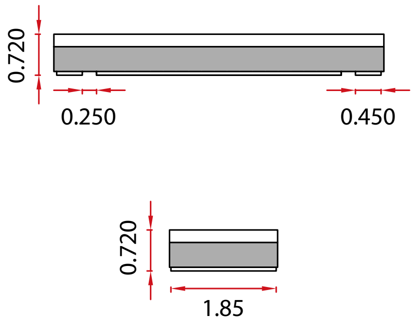
Notes:
1. Unit: mm.
2. Tolerance: ±0.05mm



Top View

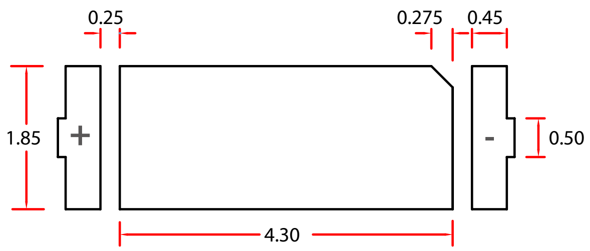


Bottom Veiw (Pad)

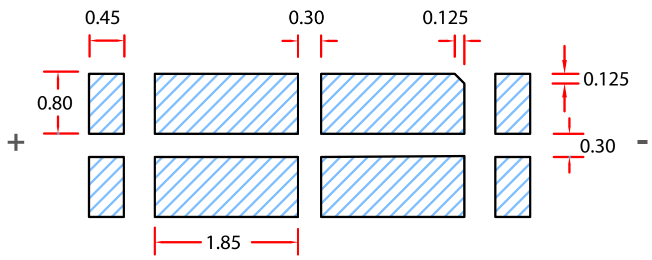


Side View

Recommended PCB Solder Pad



Recommended Stencil Mask



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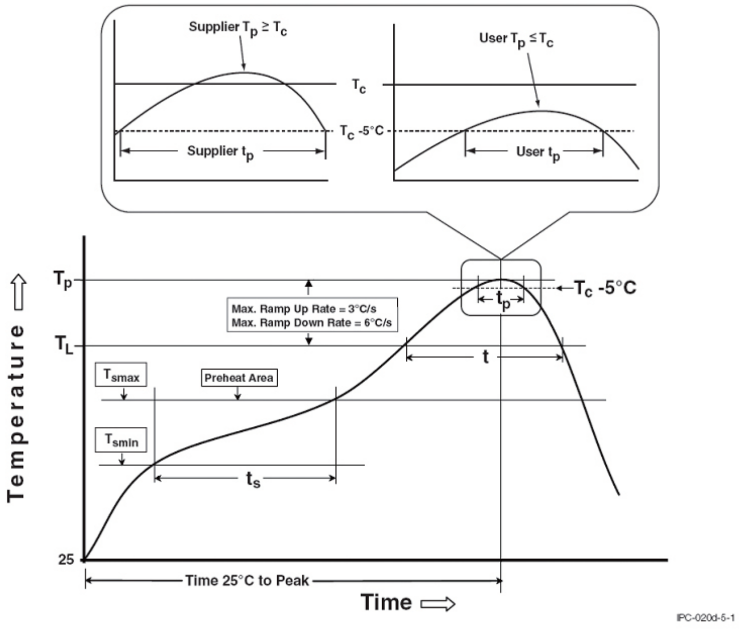
Reflow Profile



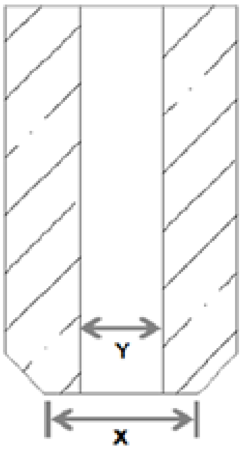
Parameter	Symbol	Pb-Free (SnAgCu) Assembly			Unit
		Minimum	Recommendation	Maximum	
Preheat and Soak temperature (Tsmin to Tsmax)	Ts	150	150~200	200	℃ /s
Time ts (Tsmin to Tsmax)	ts	60	-	120	s
Ramp-up rate to peak (Tsmax to Tp)	-	-	-	3	℃ /s
Liquidus temperature	TL		217		℃
Time above liquidus temperature	tL	60	-	150	s
Peak temperature	Tp	255	-	260	℃
Time** within 5℃ of the specified classification temperature	tp	-	30	-	s
Average ramp-down rate (Tp to Tsmax)	-	-	-	6	℃ /s
Time 25℃ to peak temperature	-	-	-	8	min

Notes:

1. * Tolerance for peak profile temperature (Tp) is defined as a supplier minimum and a user maximum.
2. ** Tolerance for time at peak profile temperature (tp) is defined as a supplier minimum and a user maximum.

Pick and Place

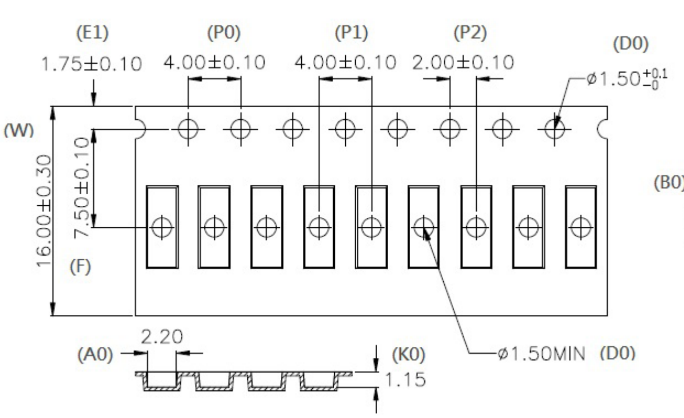
- Dong feng series is compatible for all kind of SMT instrument.
- Using the recommended nozzle design can be more accurate during the SMT process.

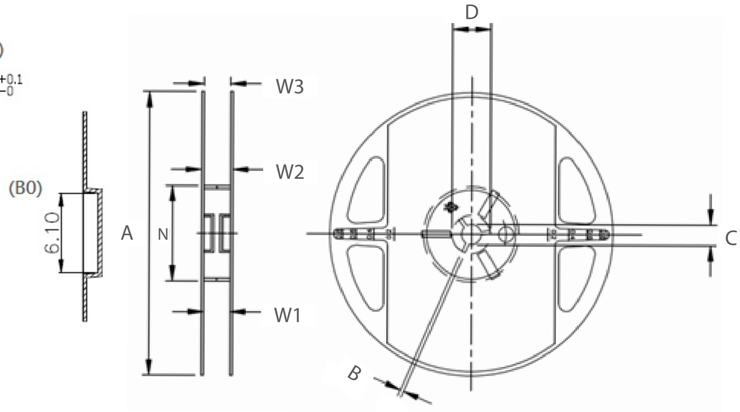


- Recommended Nozzle Specification

Parameter	Spec.
Outside Diameter(x)	Ø2.2
Inside Diameter(y)	Ø1.4
Material	Ceramic

Product Packaging information





Tape Dimensions

W	F1	F	P0	P1	P2	D0	A0	B0	K0
16 ± 0.3	1.75 ± 0.1	7.5 ± 0.1	4.0 ± 0.1	4.0 ± 0.1	2.0 ± 0.1	1.5 +0.1/-0	2.2 ± 0.1	6.1 ±0.1	1.15 ± 0.1

Reel Dimensions

A	N	W1	W2	W3	D	B	C
178 ± 1.0	60 ± 0.5	17 +0.5/-0	20 ± 0.5	>16	21.3 ± 0.2	2.3 ± 0.2	13.5 ± 0.2

Unit: mm
16 mm tape with 3000 PCS on Φ178 mm reel

Thermal management

About 80% of input power of a LED transform into heat. A high temperature operation condition always easily causes the decrease of flux and the decay of LED dies. The highest operation temperature of a component is able to be found by the indication of junction temperature in its datasheet. The power dissipation ability, the ambient temperature of LED junction, environment, thermal path and its thermal resistance are the main parameters which affect the performance of a LED device. Therefore, the limitation of junction temperature has become an important issue when designing a LED product.

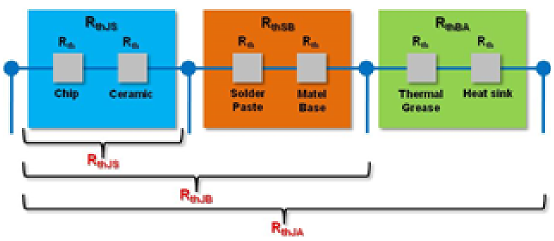
The following paragraphs describe how to determine the junction temperature and a simple ideal to heat sink design.

Thermal resistance is the temperature difference across a structure when a unit of heat energy flows through in unit time. For LEDs, temperature difference presents the temperature between a die's PN junction and package substrate. For the same package structure and operating condition, the smaller thermal resistance a LED has, the lower temperature of this LED. With lower operation temperature, a LED would keep its original performance for longer.

By estimating the PN junction temperature, users may be aware that the thermal management had been well designed.

From basic thermal equation for thermal resistance: $Rth_{(J-A)} = \frac{\Delta T_{(J-A)}}{P_D}$

Therefore the junction temperature (TJ) is: $T_J = T_A + Rth_{(J-A)} \times P_D$

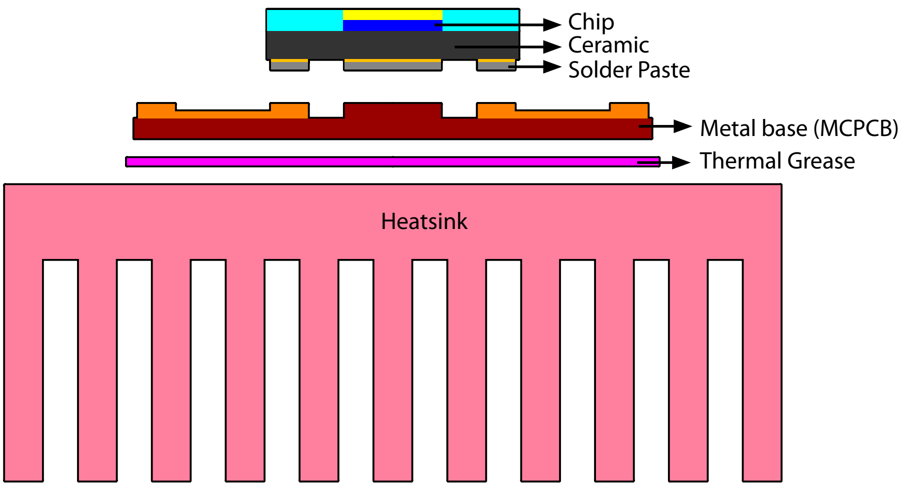


which,

PD: Power Dissipation =Forward Voltage (VF)× Forward Current (IF)

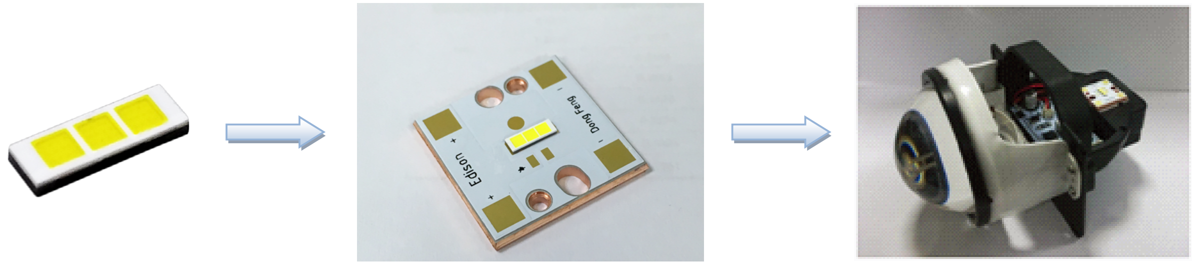
TA: Ambient Temperature (assume 25°C)

Rth(J-A): Total Thermal Resistance= Rth(J-S)+Rth(S-G)+Rth(G-B)+Rth(B-A)



Tips for Thermal Management

Dong Feng products (e.g: 9W) are not recommended to be operating without a heat sink. Through MCPCB, users may realize better performance.



For LEDs, choose an appropriate operation environment and conduct the heat to the air after light on LEDs may maintain the better performance and lifetime. Four major thermal path are as follow:

1. From heat source (component) to heat sink. (By conduction)
2. Conduction within the heat sink to its surface. (By conduction)
3. Transfer from the surface to the surrounding air. (By convection)
4. Emit heat from the heat sink surface. (By Radiation)

Path1 : The contact surface of the MCPCB and heat sink are not perfectly flat, they are not able to meet each other completely. Air between these two materials will result in high thermal resistance and reduce the effect of heat transfer. To enhance the ability of thermal conduction, one common method is applying thermal grease between the two interfaces and uses the screws to enforce the adhesion between two surfaces.

Path 2 : Temperature gradient depends on the time of a heat sink. The total heat flux(Q) consists of:

(1) The temperature difference between heat source (TJ) and heat sink(TH)

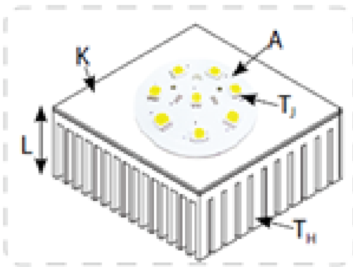
(2) Conductivity of the heat sink (K).

(3) Total surface area of the heat sink (A)

(4) The linear path distance of the heat transfer (L).

This is represented by the Fourier's Law as follow:

$$Q = K \times A \times \frac{\Delta T}{L}$$



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By choosing a higher thermal conductivity, increasing the surface area of the heat sink (add the number of fins) or shorten the distance of the linear path of heat dissipation may improve the lose of heat flux per unit time. Among all materials, metals is the best choice because of its high thermal conductivity.

List of thermal conductivity for some usual materials

Materials	K(W/m · K)
Copper	391
C1100	384
Aluminum	230
5000 Series	225
ADC-12	96.2
Magnesium	156
Air	0.024

Path3 : Heat dissipation includes convection and radiation. Those two types of transfer are proportional to the surface area of the heat sink. Adding the number of fin may increase the total surface area. However, too many fins may cause inhabitation of convection. There are many other thermal management methods such as install a fan to reach obliged convection. But this design may cause the issues such as noise or circuit design problem.

Path 4 : Compare with an unfinished heat sink, the one that covered by high emissivity material, such as ceramic powder or deep color paint, usually has better radiation ability. Both anodizing and etching are also effective to increase the thermal dissipation.

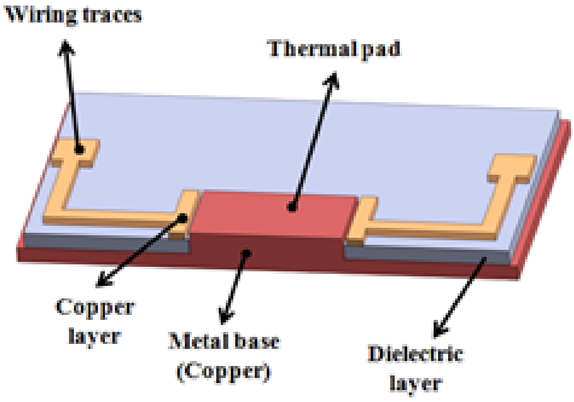
Key Points for thermal management:

- The contact surface's flatness and smoothness of the component and heat sink.
- The total surface area of heat sink.
- The selection of heat sink material.

Optimum number of fins. (Aerodynamic optimization)

Recommended PCB Design

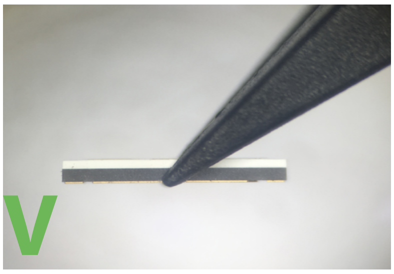
The PCB design can affect the thermal performance of the end product. In order to reduce the thermal resistance of PCB, heat must transfer through metal without dielectric layer. The figure below shows the cross -section of PCB.

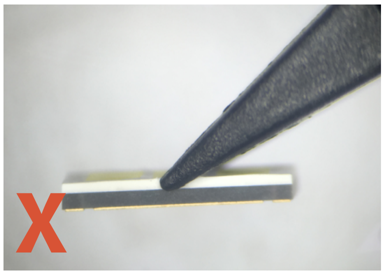


Handling Manual

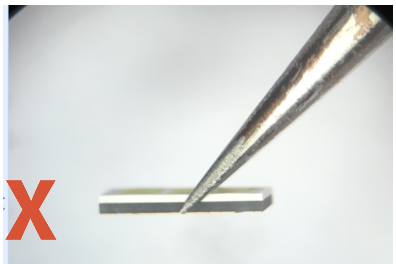
Dong Feng Series LED use phosphor film on the emitting surface, sealing by silicon. LED may be deformed or destructed if excessive force is applied.
When manual handling the LED, please use the plastic tweezers instead of the metal one.
Avoid contacting to the white silicon structure which will cause damage to the package.

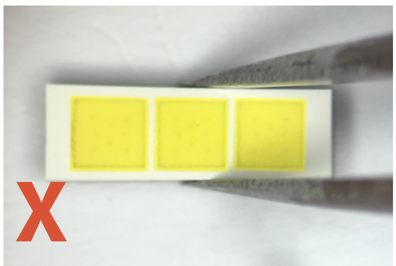
- Plastic Tweezers





- Metal Tweezers





HS and China RoHS compliants product

符合歐盟 RoHS 指令的要求；
中國的相關法規和標準，不含有毒有害物質或元素。